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Dr. Hani Abdel-Nabi is a Professor of Nuclear Medicine in the Department of Nuclear Medicine, State University of New York at Buffalo. After earning his medical degree from the University of Alexandria School of Medicine (Egypt), Dr. Nabi completed a residency in Radiation Oncology at the same institution.

In 1979, Dr. Nabi came to the Ohio State University on a Fullbright Scholarship where he earned a Ph.D. in Radiation Biology. He also joined the Department of Radiology at OSU as a resident in Nuclear Medicine, then a fellow from 1979-1983.

Dr. Nabi is a diplomate of the American Board of Nuclear Medicine. His research interests are mostly in cancer detection and treatment, specifically with radiolabeled monoclonal antibodies and more recently positron emission tomography. Dr. Nabi is author of 59 journal articles, 5 book chapters, and 135 abstracts.

He is currently the director of the Residency Training Program at SUNY and is active in academic medicine as well as in professional organizations, notably the Society of Nuclear Medicine.

Immunoscintigraphy of Indeterminate Breast Lesions

Breast Cancer is the most frequently diagnosed neoplasia in American women and the second leading cause of cancer mortality. The incidence of breast cancer increases sharply for American women in their early 40's. It then levels off after 45 years and increases again after age 55. For women 70 years old, the yearly incidence is three times that of those age 50.

Mortality from breast cancer is strongly influenced by the stage of disease at detection. An overall 8.1% decrease in breast cancer mortality was reported for 1989-1992 by the Surveillance, Epidemiology and End Results Program. Part of this decrease can be attributed to screening mammography which is the most effective approach to the early detection of breast cancer.

As a result of the widespread use of screening mammography (national rate is currently 71.2%), more abnormalities such as mass and or microcalcifications are discovered yearly. Although many of these abnormalities lack the characteristic features of malignancies, up to 700,000 women undergo biopsies for suspicious mammograms yearly, and only one out of seven biopsies prove to be cancer. Over the past decades, efforts have been directed towards the development of alternative methods that would lead to better characterization of malignant lesions.

Ultrasonography has been proven to be of benefit in separating benign simple cysts, which are unlikely to be malignant, from those complex masses which may require tissue diagnosis. The role of both magnetic resonance and positron emission tomography with ^{18}F-Fluorodeoxyglucose is still under investigation. The lipophyllic agent, sestatmibi has been advocated in patients with indeterminate mammograms and dense dysplastic breasts. Results of the multinational trial published recently demonstrated an accuracy of approximately 85% for breast masses larger than 1.0 cm in diameter. Recent evidence points to the presence of false-positive findings due primarily to an interaction between sestamibi and benign hyperplasia, or fibroadenomas. False-positive rates of up to 35% have been reported.

The recent development of monoclonal antibodies with high reactivity with tumor-specific or associated antigens offers a new avenue towards improved tumor targeting.

Arcitumomab, a technetium-^{99m} based monoclonal antibody Fab' fragments have been evaluated in patients with breast lesions as part of a multinational center trial. For a total of 139 patients, immunoscintigraphy had an overall sensitivity of 82% and a specificity of 90%. When patients with indeterminate suspicious mammograms (BiRads 3 and 4) were evaluated, Arcitumomab had a sensitivity of 62% and a specificity 0f 97%, which was significantly higher than mammography (97% vs. 75%, $p<0.01$)

Using these results to compute likelihood ratios for having or not having cancer, a positive Arcitumomab increased a patients odds of having cancer 7-fold, while a negative imaging results decreased these odds 5-fold.

As expected, tumor detection rates were influenced by the size of the lesion, varying 60% for lesions below 1.0 cm, to 92% for lesions greater than 1.1 cm. This limitation can potentially be minimized of negated by the use of postiron emitting radioisotopes labeled to the monoclonal antibody fragments, Copper-64, Iodine-124, Technetium-94m of Fluorine-18 are potential candidates that require further exploration. Features specific to each of these radioisotopes will be discussed.

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